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1-22
23-29 odd

1-2 Practice

Properties of Real Numbers

Name the sets of numbers to which each number belongs.

1. 6425 ℝ, ℚ, ℤ, 𝕎, ℕ
2. $\sqrt{7}$ ℝ, 𝕀
3. 2π ℝ, 𝕀
4. 0 ℝ, ℚ, ℤ, 𝕎
5. $\sqrt{\frac{25}{36}}$ $\frac{5}{6}$ ℝ, ℚ
6. $-\sqrt{16}$ -4 ℝ, ℚ, ℤ
7. -35 ℝ, ℚ, ℤ
8. -31.8 ℝ, ℚ,

Name the property illustrated by each equation.

9. $5x \cdot (4y + 3x) = 5x \cdot (3x + 4y)$ Comm.
10. $7x + (9x + 8) = (7x + 9x) + 8$ Assoc.
11. $5(3x + y) = 5(3x + 1y)$ Identity
12. $7n + 2n = (7 + 2)n$ Dist
13. $3(2x)y = (3 \cdot 2)(xy)$ Assoc.
14. $3x \cdot 2y = 3 \cdot 2 \cdot x \cdot y$ Comm
15. $(6 + -6)y = 0y$ Add Inv./Subst
16. $\frac{1}{4} \cdot 4y = 1y$ Mult Inv/Subst.
17. $5(x + y) = 5x + 5y$ Dist
18. $4n + 0 = 4n$ Identity

Name the additive inverse and multiplicative inverse for each number.

19. 0.4 $-.4$ $\frac{10}{5}$ $\frac{5}{2}$
20. -1.6 $+1.6$ $\frac{16}{10}$ $\frac{10}{16}$ $\frac{5}{8}$
21. $-\frac{11}{16}$ $+\frac{11}{16}$ $-\frac{16}{11}$
22. $5\frac{5}{6}$ $-5\frac{5}{6}$ $\frac{35}{6}$ $\frac{6}{35}$

odds

Simplify each expression.

23. $5x - 3y - 2x + 3y$ $3x$
24. $-11a - 13b + 7a - 3b$
25. $8x - 7y - (3 - 6y)$ $8x - y - 3$
26. $4c - 2c - (4c + 2c)$
27. $3(r - 10s) - 4(7s + 2r)$ $3r - 30s - 28s - 8r$ $-5r - 58s$
28. $\frac{1}{5}(10a - 15) + \frac{1}{2}(8 + 4a)$
29. $2(4 - 2x + y) - 4(5 + x - y)$ $8 - 4x + 2y - 20 - 4x + 4y$ $-8x + 6y - 12$
30. $\frac{5}{6}\left(\frac{3}{5}x + 12y\right) - \frac{1}{4}(2x - 12y)$

31. **TRAVEL** Olivia drives her car at 60 miles per hour for t hours. Ian drives his car at 50 miles per hour for $(t + 2)$ hours. Write a simplified expression for the sum of the distances traveled by the two cars. $60t + 50t + 100 = d$ $110t + 100 =$ distances

32. **NUMBER THEORY** Use the properties of real numbers to tell whether the following statement is true or false: If $a > b$, it follows that $a\left(\frac{1}{a}\right) > b\left(\frac{1}{b}\right)$. Explain your reasoning. $1 > 1$ False

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1-3 Practice

Solving Equations

Write an algebraic expression to represent each verbal expression.

1. 2 more than the quotient of a number and 5 — $\frac{y}{5} + 2$
2. the sum of two consecutive integers — $x + x + 1$
3. 5 times the sum of a number and 1 — $5(n+1)$
4. 1 less than twice the square of a number — $2y^2 - 1$

Write a verbal expression to represent each equation.

5. $5 - 2x = 4$
6. $3y = 4y^3$
7. $3c = 2(c - 1)$
8. $\frac{m}{5} = 3(2m + 1)$

Name the property illustrated by each statement.

9. If $t - 13 = 52$, then $52 = t - 13$. — Symm
10. If $8(2q + 1) = 4$, then $2(2q + 1) = 1$. — DIV
11. If $h + 12 = 22$, then $h = 10$. — Subtr.
12. If $4m = -15$, then $-12m = 45$. — Mult

odds

Solve each equation. Check your solution.

13. $14 = 8 - 6r$ — $r = -1$
14. $9 + 4n = -59$
15. $\frac{3}{4} - \frac{1}{2}n = \frac{5}{8}$ — $6 - 4n = 5$, $n = \frac{1}{4}$
16. $\frac{5}{6}s + \frac{3}{4} = \frac{11}{12}$
17. $-1.6r + 5 = -7.8$ — $-1.6r = -12.8$, $r = 8$
18. $6x - 5 = 7 - 9x$
19. $5(6 - 4v) = v + 21$ — $30 - 20v = v + 21$, $9 = 21v$, $\frac{3}{7} = v$
20. $6y - 5 = -3(2y + 1)$

Solve each equation or formula for the specified variable.

21. $E = mc^2$, for m — $m = \frac{E}{c^2}$
22. $c = \frac{2d + 1}{3}$, for d
23. $h = vt - gt^2$, for v — $\frac{h + gt^2}{t} = v$
24. $E = \frac{1}{2}Iw^2 + U$, for I

Define a variable, write an equation, and solve the problem.

25. **GEOMETRY** The length of a rectangle is twice the width. Find the width if the perimeter is 60 centimeters. — $2w$, w; $6w = 60$, $w = 10$; $10\text{cm} - w$, $20\text{cm} - L$
26. **GOLF** Luis and three friends went golfing. Two of the friends rented clubs for \$6 each. The total cost of the rented clubs and the green fees for each person was \$76. What was the cost of the green fees for each person? — $2 \cdot 6 + 4g = 76$, $4g = 64$, $g = 16$, \$16

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1-4

Study Guide and Intervention *(continued)*

Solving Absolute Value Equations

Absolute Value Equations Use the definition of absolute value to solve equations containing absolute value expressions.

For any real numbers a and b, where $b \geq 0$, if $|a| = b$ then $a = b$ or $a = -b$.

Always check your answers by substituting them into the original equation. Sometimes computed solutions are not actual solutions.

Example **Solve $|2x - 3| = 17$. Check your solutions.**

Case 1

$$\begin{aligned} a &= b \\ 2x - 3 &= 17 \\ 2x - 3 + 3 &= 17 + 3 \\ 2x &= 20 \\ x &= 10 \end{aligned}$$

CHECK

$$\begin{aligned} |2x - 3| &= 17 \\ |2(10) - 3| &= 17 \\ |20 - 3| &= 17 \\ |17| &= 17 \\ 17 &= 17 \checkmark \end{aligned}$$

Case 2

$$\begin{aligned} a &= -b \\ 2x - 3 &= -17 \\ 2x - 3 + 3 &= -17 + 3 \\ 2x &= -14 \\ x &= -7 \end{aligned}$$

CHECK

$$\begin{aligned} |2(-7) - 3| &= 17 \\ |-14 - 3| &= 17 \\ |-17| &= 17 \\ 17 &= 17 \checkmark \end{aligned}$$

There are two solutions, 10 and -7.

odd

Exercises

Solve each equation. Check your solutions.

1. $|x + 15| = 37$ {22, −52}
2. $|t - 4| - 5 = 0$
3. $|x - 5| = 45$ {50, −40}
4. $|m + 3| = 12 - 2m$
5. $|5b + 9| + 16 = 2$ ∅
6. $|15 - 2k| = 45$
7. $5n + 24 = |8 - 3n|$ {−2}
8. $|8 + 5a| = 14 - a$
9. $\frac{1}{3}|4p - 11| = p + 4$ $p = 23$ ✓ $4p - 11 = 3p + 12$ {−1/7, 23} $p = -\frac{1}{7}$ ✓ $4p - 11 = -3p - 12$ $7p = -1$
10. $|3x - 1| = 2x + 11$
11. $\left|\frac{1}{3}x + 3\right| = -1$ ∅
12. $40 - 4x = 2|3x - 10|$
13. $5f - |3f + 4| = 20$ {12}
14. $|4b + 3| = 15 - 2b$
15. $\frac{1}{2}|6 - 2x| = 3x + 1$ $\{\frac{1}{2}\}$
16. $|16 - 3x| = 4x - 12$

(7) $5n + 24 = |8 - 3n|$

$5n + 24 = 8 - 3n$ OR $8 - 3n = -5n - 24$

$8n = -16$ $2n = -32$

$n = -2$ ✓ $n = -16$

(13) $5f - 20 = |3f + 4|$

$3f + 4 = 5f - 20$ OR $3f + 4 = -5f + 20$

$24 = 2f$ $8f = 16$

$12 = f$ $f = 2$

(15) $|6 - 2x| = (3x + 1)2$

$6x + 2$

$6x + 2 = 6 - 2x$ OR $6x + 2 = -6 + 2x$

$8x = 4$ $4x = -8$

✓ $x = \frac{1}{2}$ $x = -2$